Site Need Statement

General Reference Information	
1 *	***Need Title*:** Monitoring of Key Waste Physical Properties During Retrieval and Transport
2 *	***Need Code*:** RL-WT032
3 *	***Need Summary*:** Monitoring of key waste physical properties during retrieval and transport of the material between tanks and to the waste treatment plant is needed to meet the contractual physical property requirements for low-activity waste feed and high-level waste feed. Control of insoluble solids is necessary for low-activity waste deliveries to the waste treatment plant to limit the solid material transferred to less than 2 weight percent (dry basis) to meet contractual requirements. For high-level waste deliveries to the waste treatment plant it is contractually required to transfer waste with between 10 and 200 grams of unwashed solids per liter of waste. Measurement of real-time solids concentration near the transfer pump inlet or in the transfer pipeline can be a key process control parameter during low-activity waste supernate deliveries (used to determine the effectiveness of the settle-decant step) and high-level waste slurry deliveries (used to determine if the slurry concentration is within range and the mass of solids in the feed batch).
4 *	***Origination Date*:** FY 2000
5 *	***Need Type*:** Technology Need
6	***Operation Office*:** Office of River Protection (ORP)
7	***Geographic Site Name*:** Hanford Site
8 *	***Project*:** Retrieval ***PBS No.:*** RL-TW04
9 *	***National Priority:*** ____1. High - Critical to the success of the EM program, and a solution is required to achieve the current planned cost and schedule. _X_2. Medium - Provides substantial benefit to EM program projects (e.g., moderate to high life-cycle cost savings or risk reduction, increased likelihood of compliance, increased assurance to avoid schedule delays). ____3. Low - Provides opportunities for significant, but lower cost savings or risk reduction, may reduce the uncertainty in EM program project success.
10	***Operations Office Priority*:**
Problem Description Information	
11	***Operations Office Program Description*:** Double Shell Tank (DST) and Waste Feed Delivery project maintains, operates and upgrades the DST System for continued safe storage and receipt of radioactive waste. Activities include transferring waste to waste treatment facilities, maintaining and evaluating operating and surveillance systems necessary for compliance with regulatory and AA/AB requirements, identifying if systems are reliable for this mission, transferring waste within the DSTs to manage the limited available space; characterizing waste to understand its properties, and developing flow sheets for waste treatment. The overall purpose of the Retrieve and Transfer DST Waste function is to provide feed to the Waste Treatment Plant (WTP) and receive waste from SSTs. A primary objective of this function is to provide the tank farm infrastructure necessary to deliver waste to the WTP within established specifications. The baseline end state of the Retrieve and Transfer DST Waste function is: • Retrieval of all wastes from the DSTs • The safe, environmentally compliant transfer of this waste to the WTP • DSTs in a ready state for implementing closure and final disposal of the DST farms.
12	***Need/Problem Description*:** The waste treatment process (vitrification) requires low-activity waste be

	delivered with no greater than 2 wt% solids (dry basis). High-level waste must be delivered at between 10 and 200 grams solids per liter, which equates to a lower limit of approximately 1-wt% solids. In either case it is desirous to know the in-situ solids content of the material being transferred to the treatment facility for the purposes of meeting the contractual requirements and for process control of the transfer. Any in-tank solids concentration instrumentation would have to withstand forces from operating equipment, primarily two, 300-hp mixer pumps, while measuring solids concentration. **Consequences Of Not Filling Need:** Failure to accurately detect deviations in the solids content may result in delivering material out of specification resulting in process delays and increased cost. Additionally, delivery of undersized high-level waste feed batches will increase the number of HLW transfers required to keep the plant running. ** **Program Baseline Summary (PBS) No.:** TW04 ** **Work Breakdown Structure (WBS) No.:** 5.02.02.01.02 ** **TIP No.:**
13	***Functional Performance Requirements*:** A method to accurately in-situ (either in-tank or in-pipe) measure solids concentration at both low concentrations (e.g. 1-5 wt%) and high concentrations (10-200 gram per liter) is needed. In-tank systems would need to withstand and operate under the forces generated from mixer pump operation. **Outsourcing Potential:** Solids concentration measurement could be applicable to other DOE and private industry cleanup sites.
**	**Schedule Requirements:** Deployment of functional systems for solids content as soon as possible will minimize the cost impacts due to changes in the existing baseline the retrieval system design.
14	***Definition of Solution*:**
15 *	***Targeted Focus Area*:** Tanks Focus Area (TFA)
16	***Potential Benefits*:**
17 *	***Potential Cost Savings*:** $20,000,000
18 *	***Potential Cost Savings Narrative*:** Deployment of in-situ solids concentration instrumentation could provide cost savings for the delivery of the waste feed to the treatment plant by increasing total operating efficiency by avoiding delivery of waste feed outside specification requirements, or inadvertent delivery of undersized HLW feed batches.
**	***Technical Basis*:** RPP Privatization Contract Number DE-AC06-96RL13308 specifies feed and product requirements.
19	***Cultural/Stakeholder Basis*:** N/A
20	***Environment, Safety, and Health Basis*:** N/A
21	***Regulatory Drivers*:** N/A
22 *	***Milestones*:**
23 *	***Material Streams*:** Sludge, salt, liquid (RL-HLW-20) ID-2113 Sludge, Salt, Liquid Risk Score: 3 ID-2857 HLW to Treatment Risk Score: 3
24	***TSD System*:** Double Shell Tank systems
25	***Major Contaminants*:** Pu-238, 239, 240, 241; AM-241; U-238; C-14; Ni-59/63; Nb-94; Tc-99; I-129;Cm-242; Sr-90; Cs-137; Sn-126; Se-79; chromium; nitrate; nitrite; complexants (EDTA/HEDTA)
26	***Contaminated Media*:** Tank waste consisting of high molarity sodium hydroxide/sodium nitrate solution containing saturated saltcake and/or sludge.

27	***Volume/Size of Contaminated Media*:** All double shell tanks are 75 feet in diameter, and about 40 feet deep, deep with their tops buried about 10 feet below the ground surface.
28 *	***Earliest Date Required*:** Fiscal Year 2002
29 *	***Latest Date Required*:** September 2008
Baseline Technology Information	
30	***Baseline Technology/Process*:** Technology Insertion Point(s):
31	***Life-Cycle Cost Using Baseline*:**
32	***Uncertainty on Baseline Life-Cycle Cost*:**
33	***Completion Date Using Baseline:***
Points of Contact (POC)	
34	***Contractor End User POCs*:** Paul J. Certa, CHG, 509-376-5429, Paul_J_Certa@rl.gov
35	***DOE End User POCs*:** E.J. (Joe) Cruz, DOE-PRD, 509-372-2606, F/509-373-1313, E_J_Cruz@rl.gov
36 **	***Other Contacts:*** J.G. (John) Kristofzski, CHG, 509-373-4225, F/509-372-1664, John_G_Kristofzski@rl.gov K.A. (Ken) Gasper, CHG, 509-373-1948, F/509-376-1788, Kenneth_A_Ken_Gasper@rl.gov

*Element of a Site Need Statement appearing in IPABS-IS
**Element of a Site Need Statement required by CHG